Vapor-Liquid Equilibrium (p-T-x-y) Data on R22/124, R22/152a, and R22/125 Mixtures

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Data on the p-T-x-y properties of the binary HCFC and HFC mixtures 22/124, 22/152a and 22/125 are presented. The binary VLE data on the components of blend refrigerants such as R-401 A and B (blends of R22, R152a, and R124) and R-402 A and B (blends of R125, propane, and R22) have been scarce in the open literature, even though these blends are very widely used. These binary data are needed for accurate formulation of the thermodynamic properties of the ternary refrigerants.

Vapor-liquid equilibrium measurements on the three binary mixtures of 22 were made from –18°C to 50°C which represents most of the operation range for R-401 and R-402 series of refrigerants. For the 22/124 binary mixture, VLE measurements were performed at nominal 20, 40, 50, 60 and 80 mol% 22 composition. This system is not azeotropic and it exhibits slightly positive deviations from Raoults law at lower temperatures and slightly negative deviations at higher temperatures. For the 22/152a and 22/125 binary mixtures, VLE measurements were performed at nominal 30, 50, 60, 70 and 80 mole% 22 composition. These two systems are also not azeotropic and both exhibit negative deviations from a Raoults law. The uncertainty in the pressure measurements is placed at ± 2 kPa and the uncertainty in temperature at ± 0.05°C. The reproducibility of the GC based composition measurement is estimated at better than ± 0.3%. The VLE data are compared with those predicted by the REFPROP refrigerant property estimation program.